



وزارة التربية والتعليم
والتعليم الفني

نموذج إجابة

امتحان شهادة إتمام الدراسة الثانوية العامة

للعام الدراسى ٢٠١٦/٢٠١٧ ـ الدور الأول

المـادة : الجبر والهندسة الفراغية (باللغة الالمانية)

نموذج

أ

Die Fragen von → bis	der Punkt
1 → 5	7
6 → 8	5
9 → 11	6
12 → 15	5
16 → 19	7
Die Summe	30

1-

(C) ${}^{6}c_2 + {}^{6}c_3$ 1

2-



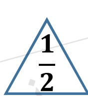
(b) 4 1

3-

(c) T_6 1

4-

$\because T_3 = {}^{n}C_2 \times X^2 = 17 \longrightarrow (1)$ $\frac{1}{2}$

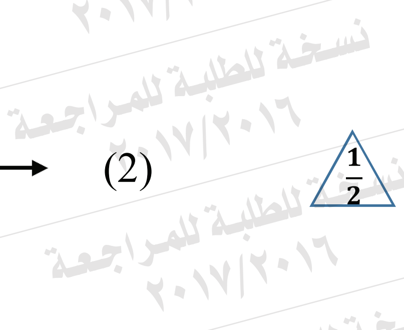


$T_2 \times T_4 = \frac{544}{3}$ durch Dividieren durch T_3

$n \times X \times \frac{T_4}{T_3} = \frac{544}{3\times17}$ $\frac{1}{2}$

$n \times X \times \frac{n-3+1}{3} \times X = \frac{32}{3}$

$n X^2 (n-2) = 32 \longrightarrow (2)$ $\frac{1}{2}$



Von (1) und (2) durch Dividieren

$$\frac{n\,(n-1)\,X^2}{2\,n\;X^2\,(n-2)} = \frac{17}{32}$$

$$\therefore \frac{n-1}{n-2} = \frac{34}{32}$$

$$\frac{n-1}{n-2} = \frac{17}{16}$$ $\frac{1}{2}$

$17n - 34 = 16n - 16$

$n = 18$

Durch Substituieren in (2)

$18 \times X^2 \times 16 = 32$

$X^2 = \frac{1}{9}$ $\frac{1}{2}$ $\Longrightarrow$ $X = \pm\frac{1}{3}$ $\frac{1}{2}$

Andere Lösung:-

$${}^{n}C_2\,(x)^2 = 17$$

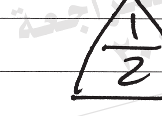
$$3\left({}^{n}C_1 \times x\right)\left({}^{n}C_3 \times x^3\right) = 544$$

$$\frac{n(n-1)}{2}\,x^2 = 17$$

$$n(n-1)\,x^2 = 34 \longrightarrow (1)$$ $\frac{1}{2}$

$$3nx \times \frac{n(n-1)(n-2)}{6}\,x^3 = 544$$

$$n^2(n-1)(n-2)\,x^4 = 1088 \longrightarrow (2)$$



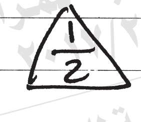
von (1) & (2)

$$\frac{n^2(n-1)(n-2)\,x^4}{n^2(n-1)(n-1)\,x^4} = \frac{1088}{1156}$$ $\frac{1}{2}$

$$\frac{n-2}{n-1} = \frac{16}{17}$$

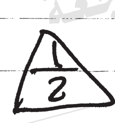
$$17n - 34 = 16n - 16$$

$$n = 18$$



Durch Subsitituieren in (1) $18(18-1)\,x^2 = 34$

$$18 \times 19\,x^2 = 34$$



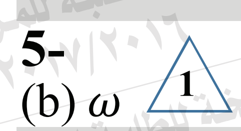
$$9x^2 = 1$$

$$x^2 = \frac{1}{9}$$

$$x = \pm\frac{1}{3}$$ $\frac{1}{2}$

5-

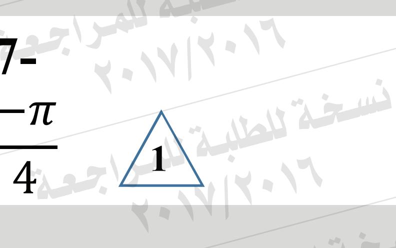
(b) ω



6-

(c) 1 △ 1

7-



$\frac{-\pi}{4}$ △ 1

8-

a-

$r = \sqrt{2}$, $\tan\theta = 1$

$\therefore \theta = \frac{\pi}{4}$ △ $\frac{1}{2}$

$\therefore Z = \sqrt{2}\,(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4})$

$Z^{\frac{1}{3}} = 2^{\frac{1}{6}}\,(\cos\frac{\frac{\pi}{4} + 2\pi n}{3} + i\sin\frac{\frac{\pi}{4} + 2\pi n}{3})$ △ $\frac{1}{2}$

Wobei $n = 0, 1, 2$ △ $\frac{1}{2}$

Bei $n = 0$ $\quad Z_1 = 2^{\frac{1}{6}}\,(\cos\frac{\pi}{12} + i\sin\frac{\pi}{12})$

$= 2^{\frac{1}{6}}\, e^{\frac{\pi}{12}i}$ △ $\frac{1}{2}$

Bei $n = 1$ $\quad Z_2 = 2^{\frac{1}{6}}\,(\cos\frac{3\pi}{4} + i\sin\frac{3\pi}{4}) = 2^{\frac{1}{6}}\, e^{\frac{3\pi}{4}i}$ △ $\frac{1}{2}$

Bei $n = 2$ $\quad Z_3 = 2^{\frac{1}{6}}\,(\cos\frac{-7\pi}{12} + i\sin\frac{-7\pi}{12}) = 2^{\frac{1}{6}}\, e^{\frac{-7\pi}{12}i}$ △ $\frac{1}{2}$

b-

$$r = \sqrt{1^2 + \left(-\sqrt{3}\right)^2} = 2 \quad \tfrac{1}{2}$$

$$\tan\theta = \frac{-\sqrt{3}}{1} = -\sqrt{3} \quad \tfrac{1}{2}$$

$$\therefore \theta = -60^\circ \quad \tfrac{1}{2}$$

$$\therefore Z = 2\left[\cos(-60^\circ) + i\sin(-60^\circ)\right] \quad \tfrac{1}{2}$$

$$Z^{\frac{3}{2}} = 2^{\frac{3}{2}}\left[\cos(-60^\circ) + i\sin(-60^\circ)\right]^{\frac{3}{2}} \quad \tfrac{1}{2}$$

$$Z^{\frac{3}{2}} = 2\sqrt{2}\left[\cos(-90^\circ) + i\sin(-90^\circ)\right] \quad \tfrac{1}{2}$$

$$\text{oder} = 2\sqrt{2}\left[\cos(90^\circ) + i\sin(90^\circ)\right]$$

9-

$$C_2 - C_1 \ , C_3 - C_1 \quad \Rightarrow \begin{vmatrix} 1 & 0 & 0 \\ x & y-x & 0 \\ x & 0 & -y-x \end{vmatrix} \quad 1$$

$$= 1 \times (y-x)(-y-x) \quad \tfrac{1}{2}$$

$$= -(y-x)(y+x)$$

$$= -(y^2 - x^2)$$

$$= x^2 - y^2 \quad \tfrac{1}{2}$$

10-

(c) $(x-2)^2 + y^2 + z^2 = 4$ 1

11- Lassen wir $A = \begin{pmatrix} 2 & -3 & -1 \\ 1 & 2 & 3 \\ 1 & 0 & -2 \end{pmatrix}$

$$|A| = \begin{vmatrix} 2 & -3 & -1 \\ 1 & 2 & 3 \\ 1 & 0 & -2 \end{vmatrix} = 2 \times -4 + 3 \times -5 - 1 \times -2$$

$$= -21 \quad \neq 0 \quad \triangle\tfrac{1}{2}$$

$\therefore \; Rang\;(A) = 3$

Die Kofaktormatrix =

$$\begin{pmatrix} \begin{vmatrix} 2 & 3 \\ 0 & -2 \end{vmatrix} & -\begin{vmatrix} 1 & 3 \\ 1 & -2 \end{vmatrix} & \begin{vmatrix} 1 & 2 \\ 1 & 0 \end{vmatrix} \\ -\begin{vmatrix} -3 & -1 \\ 0 & -2 \end{vmatrix} & \begin{vmatrix} 2 & -1 \\ 1 & -2 \end{vmatrix} & -\begin{vmatrix} 2 & -3 \\ 1 & 0 \end{vmatrix} \\ \begin{vmatrix} -3 & -1 \\ 2 & 3 \end{vmatrix} & -\begin{vmatrix} 2 & -1 \\ 1 & 3 \end{vmatrix} & \begin{vmatrix} 2 & -3 \\ 1 & 2 \end{vmatrix} \end{pmatrix} \triangle\tfrac{1}{2} = \begin{pmatrix} -4 & 5 & -2 \\ -6 & -3 & -3 \\ -7 & -7 & 7 \end{pmatrix} \triangle\tfrac{1}{2}$$

$$\therefore \; Adj\;(A) = \begin{pmatrix} -4 & -6 & -7 \\ 5 & -3 & -7 \\ -2 & -3 & 7 \end{pmatrix} \quad \triangle\tfrac{1}{2}$$

$$\therefore \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \frac{-1}{21} \times \begin{pmatrix} -4 & -6 & -7 \\ 5 & -3 & -7 \\ -2 & -3 & 7 \end{pmatrix} \times \begin{pmatrix} 9 \\ 15 \\ 12 \end{pmatrix} \quad \triangle\tfrac{1}{2}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \frac{-1}{21} \begin{pmatrix} -210 \\ -84 \\ 21 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 10 \\ 4 \\ -1 \end{pmatrix} \quad \triangle\tfrac{1}{2}$$

$\therefore \; x = 10 \;\;, y = 4 \;\;, z = -1$

12-

(c) $(4, \ 1, \ -1)$ 1

13-

(c) $85^\circ \ 4^\backslash$ 1

14-

(d) 6 1

15-

a-

1) $\overrightarrow{AB} \cdot \overrightarrow{AC} = AB \times AC \times \cos(\angle ABC)$ $\frac{1}{2}$

$= 6 \times 10 \times \frac{6}{10}$

$= 36$ $\frac{1}{2}$

2) Die Komponente von $\overrightarrow{CD}$ in der Richtung von $\overrightarrow{BC}$ $=$

$\frac{\overrightarrow{CD} \cdot \overrightarrow{BC}}{\|\overrightarrow{BC}\|} = Null$ $\frac{1}{2}$

Weil sie senkrecht sind. $\frac{1}{2}$

b-

$\because cos^2\theta_1 + cos^2\theta_2 + cos^2\theta_3 = 1$ $\frac{1}{2}$

$\because Die\ Winkel\ sind\ gleich = \theta$

$\therefore 3cos^2\theta = 1$ $\frac{1}{2}$

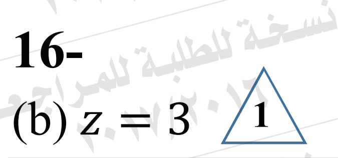
$\therefore cos^2\theta = \frac{1}{3}$

$\cos\theta = \pm\frac{1}{\sqrt{3}}$

$\therefore = \|\overrightarrow{A}\| [\cos\theta\ \hat{\imath} + \cos\theta\ \hat{\jmath} + \cos\theta\ \hat{k}]$ $\frac{1}{2}$

$= 21\sqrt{3}\left[\pm\frac{1}{\sqrt{3}}\hat{\imath} \pm \frac{1}{\sqrt{3}}\hat{\jmath} \pm \frac{1}{\sqrt{3}}\hat{k}\right]$ $\frac{1}{2}$

$\overrightarrow{A} = \pm[21\hat{\imath} + 21\hat{\jmath} + 21\hat{k}]$



16-

(b) $z = 3$ (1)

17-

(c) $\left(\frac{-1}{\sqrt{14}}, \frac{2}{\sqrt{14}}, \frac{3}{\sqrt{14}}\right)$ (1)

18-

$\because$ Die Ebene enthält die Gerade L_1 ($\frac{1}{2}$)

$\therefore$ Der Punkt a (0, 3, -5) ∈ der Ebene

$\because$ Die Ebene // der Geraden L_2, deren Richtungsvektor (1, -3, 3) ($\frac{1}{2}$)

$\therefore$ Der Vektor (1, -3, 3) ⊥ zur Ebene, deren Gleichung erforderlich ist. ($\frac{1}{2}$)

$\therefore$ Die Gleichung der erforderlichen Ebene lautet:

$(1, -3, 3) \cdot \vec{r} = (1, -3, 3) \cdot (0, 3, -5)$. ($\frac{1}{2}$)

$\therefore x - 3y + 3z + 24 = 0$

19-

Die Gleichung lautet:

$\frac{x}{4} + \frac{y}{6} + \frac{z}{3} = 1$

$\therefore$ Die Punkte sind $A(4,\ 0,\ 0)$, $B(0,\ 6,\ 0)$, $C(0,\ 0,\ 3)$ $\frac{1}{2}$

$\overrightarrow{AB} = \vec{B} - \vec{A} = (0,6,0) - (4,0,0) = (-4,6,0)$ $\frac{1}{2}$

$\overrightarrow{AC} = \vec{C} - \vec{A} = (0,0,3) - (4,0,0) = (-4,0,3)$ $\frac{1}{2}$

$$\therefore \overrightarrow{AB} \times \overrightarrow{AC} = \begin{vmatrix} \hat{\imath} & \hat{\jmath} & \hat{k} \\ -4 & 6 & 0 \\ -4 & 0 & 3 \end{vmatrix}$$

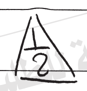
$$= 18\,\hat{\imath} + 12\hat{\jmath} + 24\hat{k} \quad \frac{1}{2}$$

$\because$ Die Fläche des Dreiecks $= \frac{1}{2}\,\|\overrightarrow{AB} \times \overrightarrow{AC}\|$ $\frac{1}{2}$

$$= \frac{1}{2}\sqrt{18^2 + 12^2 + 24^2} \quad \frac{1}{2}$$

$$= \sqrt{261} = 3\sqrt{29} \text{ Quadrateinheit}$$

Andere Lösung:-

Die Gleichung: $\frac{x}{4} + \frac{y}{6} + \frac{z}{3} = 1$ 

$\frac{1}{2}$

$\therefore$ Die Punkte sind: $A(4, 0, 0)$, $B(0, 6, 0)$, $C(0, 0, 3)$

$AB = \sqrt{(4-0)^2 + (0-6)^2 + (0-0)^2} = \sqrt{52} = 7{,}2$ Längeneinheit

$AC = \sqrt{(4-0)^2 + (0-0)^2 + (0-3)^2} = \sqrt{25} = 5$ Längeneinheit

$BC = \sqrt{(0-0)^2 + (6-0)^2 + (0-3)^2} = \sqrt{45} = 6{,}7$ Längeneinheit $\frac{1}{2}$

Die Fläche des Dreieckes $= \sqrt{P(P-a)(P-b)(P-c)}$ $\frac{1}{2}$

$P = \frac{1}{2}(a + b + c) = \frac{1}{2}(7{,}2 + 5 + 6{,}7) = 9{,}45$ $\frac{1}{2}$

Die Fläche des Dreieckes $= \sqrt{9{,}45(9{,}45 - 7{,}2)(9{,}45 - 5)(9{,}45 - 6{,}7)}$

$= 16{,}1$ Quadrateinheit $\frac{1}{2}$

Die Antworten sind zu Ende.

Alle andere richtige Antworten gelten als richtig